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## Advertisement Retargeting In Voice Activated Computing Systems

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## **ADVERTISEMENT RETARGETING IN VOICE ACTIVATED COMPUTING SYSTEMS**

Voice activated computing systems provide a user with content or services in response to voice commands spoken by the user. Such systems can capture voice commands from a user, process the voice commands to determine requests and keywords in the voice commands, and provide the user with content or services related to the determined requests and keywords.

As discussed herein, a voice activated computing system processes the voice commands and generates responses along with retargeted advertisements. The retargeted advertisements are provided to the user if the user has previously performed an action related to the advertisement, the merchant providing the advertisement, or an ad campaign associated with the merchant. For example, if the user sends voice commands to the system stating: “I would like to go to the movies,” the system can generate responses such as a list of movies that the user can watch and a list of theaters where the movies are playing. In addition, the system can provide the user retargeted ads related to the user’s requests. For example, if the user had recently watched a movie at a nearby theater, and the theater is currently offering discounts to patrons that have recently visited the theater, the system can send the promotion to the user.

In some instances the system can determine a sequence of actions based on one or more voice commands received from the user. For example, if the user sends a voice message “I would like to go for dinner and a movie,” the system can generate a series of actions, such as reserving a restaurant and purchasing a movie ticket. The system can also predict additional actions, such as transportation to the dinner or transportation back from the movies. In addition to generating actions, the system also can generate retargeted ads. For example, if the user

passed on a restaurant on a previous occasion, or passed on the transportation offer, the system could provide the user an ad for that restaurant or the transportation this time around.

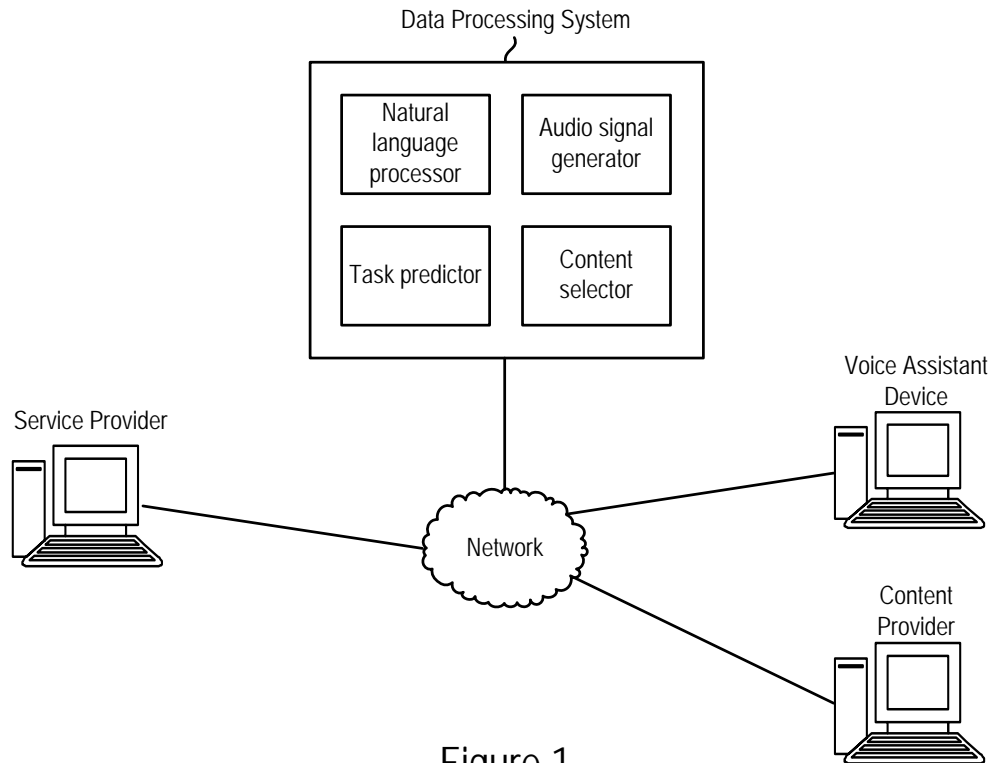


Figure 1

Figure 1 shows an example voice activated computing system. The system includes a voice assistant device, a service provider, a content provider, and a data processing system communicating over a network. The voice assistant device can be a device that accepts voice commands, and provides audio or visual output. The voice assistant can include one or more mics and cameras, such that voice commands received by the user are converted into corresponding audio signals. The voice assistant can send the audio signals to the data processing system and the service provider. The voice assistant device also can receive data such as audio signals or video signals from the data processing system or the service provider.

The voice assistant device also can include audio speakers that can convert the audio signals received from the data processing system or the service provider into sound.

The data processing system can process voice commands received from the voice assistant device. The data processing system includes a natural language processor, an audio signal generator, a task predictor, and a content selector. The natural language processor is capable of processing voice commands included in the audio signals received from the voice assistant device. The natural language processor can convert the audio signals into recognized text by comparing the audio signals against a stored, representative set of audio waveforms, and choosing the closest matches. The representative waveforms are generated across a large set of users, and can be augmented with speech samples. After the audio signals are converted into recognized text, the natural language processor can match the text to words that are associated, for example via training across users or through manual specification, with actions that the data processing system can serve. Basically, the natural language processor identifies requests and trigger words in the converted text, based on which the natural language processor can determine the content and actions to be carried out. The task predictor can predict tasks or actions based on the converted text, and in particular by identifying requests and trigger keywords in the converted text. The task predictor also can predict the most likely sequence in which the tasks would be executed. The task predictor can form execution threads that can sequentially execute the tasks. In addition, the task predictor can predict new actions that although are not expressly requested by the user, can be proposed to the user.

The content selector can select content, such as services to be offered to the user based on the actions identified by the task predictor. In addition, the content selector can alter the sequence or the order in which the actions related to the services offered to the user are executed.

The content selector can communicate with one or more service providers and one or more content providers to select content to be presented to the user. The audio signal generator can generate audio signals based on the services selected by the content selector. The audio signals can be representative of voice responses or voice instructions provided to the user in response to the voice commands.

The service provider can provide one or more service to the user. For example, the service provider can be a taxi or car sharing service provider, dining or reservation service provider, a movie ticket vendor, and the like. The service provider can communicate with the voice assistant device via, or independently of, the data processing system and provide the user the ability to request a ride, do a dinner reservation, or avail of other services provided by the service provider. The service provider can also include a natural language processor, similar to the one discussed above in relation to the data processing system, to convert user voice commands into text, and identify requests and keywords to determine the services requested by the user.

The content provider can provide sponsored content items related to the requests and trigger keywords identified in the voice command. The content items provided by the content provider can be provided to the user in addition to the response to the requests made by the user in the voice command. The sponsored content can include ads that can be provided to the user, where the ads can be selected based on results of matching keywords associated with the ad and the requests or trigger keywords identified in the voice commands received from the user.

Referring again to the voice command example mentioned above, the user can speak the voice command “I would like to go to the movies,” to the voice assistant device. The mics at the

voice assistant device can convert the voice commands into corresponding audio signals, which are be transmitted by the voice assistant device to the data processing system over the network.

At the data processing system, the natural language processor processes the audio signal received form the voice assistant device and identify a request for “movies.” The natural language processor also can identify a trigger keyword “go” or “to go to,” which can indicate a need for transportation. Even though the user’s voice command does not directly express an intent for transportation, the trigger keyword indicates that transportation may be needed.

The task predictor, based on the requests for “movies” and on the trigger keywords, can determine a most likely sequence of actions related to the voice command. For example, the task predictor can determine a task sequence that includes movie ticket purchase, booking a ride to the movie theater, and booking a ride from the movie theater.

The content selector can determine the names of the movies to be presented to the user. As mentioned above, the content selector can determine which of the many names of movies provided by the service providers to be presented to the user based on a current location of the user and the user’s interests.

The content selector also can provide sponsored content to the user, where the sponsored content is related to the requests identified in the voice command received from the user. For example, the content selector can identify that a request for “movies” in the voice command received from the user. Based on the requests for “movies,” the content selector can provide the user promotions or ads from movie theaters or other vendors that have included the keyword “movies” in their ad. However, the content selector can also consider user performing pre-specified actions to determine which ads to present to that user. If the user has performed the pre-specified actions, the content selector can provide the user with a different set of ads than it

would if the user had not performed the pre-specified actions. For example, using the example discussed above, suppose that the pre-specified action is visiting a particular movie theater in the last 30 days. If the user has performed this action, then the user will be presented with a discount promotion. If the user has not performed this action, then the user would not be presented with the discount promotion, and may be presented with a different ad or no ad at all.

The system can maintain a retargeting list of users, to whom an ad or sponsored content can be retargeted. In some cases the list can be provided by the merchants or content providers, and can be readily updated. For example, a movie theater can provide a list of visitors to which it would like to retarget. If a voice command received from a user that includes a request that matches the keyword selected by the movie theater to trigger an ad, and the user appears in the retargeting list of users provided by the movie theater, the system will provide the user with an ad or promotion that is specifically reserved for those users appearing in the retargeting list.

In some instances, the list can be automatically populated. For example, the system can store a script, which is executed each time the user performs the pre-specified action, such as, for example, purchasing a movie ticket at the particular movie theater. The script, when executed, can add the users name or identity to the retargeting list of users. The system may also run scripts that can automatically remove users from the list if their action was older than 30 days, or based on other factors provided by the merchant. In some instances, the scripts can be executed at the merchants website, store, or other terminal of sale. When executed, the script can communicate with the system and provide the identity of the user, as well as an identity of the list(s), and the keyword associated with the merchant. The system can then add the user to the specified list. Similarly, user deletion scripts also can be run by the merchant, which can communicate with the system to specify user to be removed from a specified list.

The system can also adapt a bidding process used to provide sponsored content to the users for retargeting. During an auction process, multiple merchants can compete to provide the user with their ad or promotion in response to a request identified in the user's voice command matching a keyword specified by the merchant. For example, several merchants can specify the keyword "movie," which would match the request for a "movie" identified in the foregoing example voice command. Each merchant's bids are compared, and the ad of the winner of the auction is presented to the user. The system can allow merchants to increase their bid for presenting an ad to the user if the user appears on a retargeting list associated with the merchant and the keyword specified by the merchant. For example, if the merchant bid \$0.5 for presenting its' ad to users whose voice command includes requests that match a keyword specified by the merchant, the merchant can be allowed to increase its bid to, say, \$1, if the user also appears in the retargeting list of users. This can increase the likelihood that the merchant's ad would be selected over ads of other merchants.

In some instances, the system can maintain more than one retargeting lists associated with a merchant, where each list can be associated with a particular action or interaction performed by the user. For example, the system can maintain a first retargeting list of users that have visited the movie theater in the last 30 days, a second retargeting list of users that have purchased drinks at the movie theater, and a third retargeting list of users that have refused previous promotional ads. The merchant can specify the manner in which the three retargeting lists can be used. For example, the merchant may specify one or more logical operators such as AND, OR, NOT, XOR, etc., to be used in conjunction with the three retargeting lists to determine when a user may or may not be eligible to receive a promotional ad. For example, a



user appearing in the first list (visited in the last 30 days) and the third list (refused previous promotional ads) may not be provided with a promotional ad.

The merchants can also specify their bidding amounts based on the result of the logical operations on one or more retargeting lists. For example, if the user appears in the first and the second lists mentioned above, the merchant may specify a higher bidding amount than if the user appeared only in the first list. Further, the merchant may specify to completely withdraw its bid, or reduce the bid amount, if the user appears in the third list.

In some instances, the system can implement several features for presenting the promotional ads to the user. In one approach, the system can implement a feature in which the retargeting ad is presented to the user only if the retargeting ad and the keyword are specified by the same merchant. In another approach, the system can implement a feature in which the promotional ad is presented a predetermined number of times to users. That is, the merchant can specify to present the promotional ad to no more than 10 users. In some instances, the system can count down the number of time a promotional ad can be presented only if a user accepts the promotion. In another approach, the system can implement a feature in which if two or more keywords from the same merchant match the request identified in the voice command, and the user is also eligible for retargeting based on one or more retargeting lists, then the system may remove one or more keywords from the auction, so as to prevent the merchant from competing against its own bids.

Once the systems selects a merchant's ad, the content selector can select a content item associated with the ad. The content item can be an audio file that can be sent to the voice assistant device of the user to playback the ad. The content item also can be an image, a text, or

other media that can be displayed to the user on the voice assistant device or other devices of the user.

## Abstract

This document describes a technique for processing voice commands in a voice activated computing system. In particular, the system processes the voice commands and generates responses along with retargeted advertisements. The retargeted advertisements are provided to the user if the user has previously performed an action related to the advertisement, the merchant providing the advertisement, or an ad campaign associated with the merchant. The system can maintain one or more retargeting list that can include identities of users. If the user appears in one or more of the retargeting lists, that user can be presented with a retargeted promotional ad. In some instances the system can determine a sequence of actions based on one or more voice commands received from the user. If the user passed on a promotion during the execution of a sequence of events, the system could again provide the user with the promotion if the same sequence of actions is executed in the future. The system can also adapt a bidding process used to provide sponsored content to the users for retargeting. For example, the system can allow merchants to increase their bid for presenting a retargeted ad to the user, increasing the likelihood of the merchant winning the auction.